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SEARCH CONTROL NO. CLS07D

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Attenuation of Rayleigh Waves by Point Defects.
AD-A060950 REPORT DATE: 77 FINAL REPORT

Coherent Curvature Radiation from an Electron Beam Rotating in a Plasma,
AD-A082578 REPORT DATE: 25 SEP 78 FINAL REPORT

Complex Scalar Fields in One Dimension with Fourfold Phase Anisotropy: Solitary-Wave Solutions,
AD-A070425 REPORT DATE: 27 MAR 78 FINAL REPORT

Contribution of Electron-Electron Normal Scattering Processes to the Electrical Resistivity of Thin Wires,
AD-A086906 REPORT DATE: 29 OCT 79 FINAL REPORT

The Dielectric Constant Associated with Direct Interband Transitions in Germanium,
AD-A043314 REPORT DATE: 02 NOV 76 FINAL REPORT

Dynamic Effective Charge and Surface Reconstruction on Si(111),
AD-A062421 REPORT DATE: 10 MAY 76 FINAL REPORT

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AD-A086909 REPORT DATE: 25 JUL 78 FINAL REPORT

Effective-modulus Approximation for Surface-vibration Modes,
AD-A065708 REPORT DATE: 17 AUG 77

Elastic Continuum Theory of Interface-Atom Mean-Square Displacements,
AD-A045736 REPORT DATE: 07 SEP 76 FINAL REPORT

Elastic Continuum Theory of Surface-Atom Mean-Square Displacements,
AD-A045502 REPORT DATE: 12 JUL 76

Electromagnetic Modes of an Inversion Layer on a Semiconductor Surface,
AD-A066069 REPORT DATE: 30 JUN 77

Electromagnetic Modes of an Inversion Layer.
AD-A057732 REPORT DATE: 78 FINAL REPORT

Electrostatic Edge Modes Along a Parabolic Wedge.
AD-A037884 REPORT DATE: 08 JUL 76 FINAL REPORT

Expansion Technique for Crystal Surface Problems,
AD-A064635 REPORT DATE: 08 JAN 76

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AD-A082579 REPORT DATE: 18 AUG 78 FINAL REPORT

The g Tensor of d Holes in Palladium,
AD-A065227 REPORT DATE: 30 MAY 78

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Influence of fd Mixing on Electronic Impurity Levels in Rare Earth Semiconducting Compounds,
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Light Scattering Spectra of Guided Wave Polaritons in Thin Crystals: Experiment,
  AD-A078458          REPORT DATE: 08 MAY 78     FINAL REPORT

Magnetic Scattering of Electrons from Ferromagnets in the Presence of Magnetic Surface Reconstruction,
  AD-A067635          REPORT DATE: 10 JUL 78

Magnon Edge Modes,
  AD-A043313          REPORT DATE: 25 AUG 76     FINAL REPORT

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  AD-A082577          REPORT DATE: 30 JAN 79     FINAL REPORT

Nonlocal Shift of Coupled Surface Plasmon-Surface Optical Phonon Modes in a Quantizing Magnetic Field,
  AD-A063695          REPORT DATE: 08 AUG 76

Phonon Contribution to the Free Energy of Interacting Adatom Pairs.
  AD- 765440          REPORT DATE: 13 OCT 72

Photoelastic and Surface-Corrugation Contributions to Brillouin Scattering from an Opaque Crystal,
  AD-A068133          REPORT DATE: 03 APR 78

Raman Scattering Selection Rules for Surface Polaritons,
  AD-A078150          REPORT DATE:          77     FINAL REPORT

Selection Rules in Raman Scattering from Surface Polaritons,
  AD-A063222          REPORT DATE: 14 FEB 77     FINAL REPORT

Simple Calculation of Optical Absorption of Ni in the Near Infrared,
  AD-A070396          REPORT DATE: 20 JUN 78     FINAL REPORT

Some Consequences of Surface Roughness for the Dynamical Properties of Solid Surfaces,
  AD-A073075          REPORT DATE:          79     FINAL REPORT

Spin-Wave Renormalization in Exchange- and Dipolar-Coupled Ferromagnets: Bulk Spin Waves and the Damon-Eshbach Surface Spin
        Wave,
  AD-A078180          REPORT DATE: 13 MAR 79     FINAL REPORT

Surface Acoustic Wave Propagation on Magnetic Substrates.
  AD-A069334          REPORT DATE:    MAY 79     FINAL REPORT

Surface Contribution to the Low-Temperature Specific Heat of a Cubic Crystal,
  AD-A051939          REPORT DATE: 31 MAY 77     FINAL REPORT

Surface Magnetoplasma Waves in Nickel,
  AD-A048513          REPORT DATE:          77     FINAL REPORT
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Surface Phonons and Polaritons.
AD-A062164 REPORT DATE: 76 FINAL REPORT

Surface Plasma Waves in Silver and Gold.
AD-A066541 REPORT DATE: 76

A Surface Plasmon Dispersion Relation in the Presence of Spatial Dispersion.
AD-A062250 REPORT DATE: 30 SEP 78 FINAL REPORT

Surface Polaritons in a Degenerate Semiconductor with a Surface Depletion Layer: Hydrodynamical Model.
AD-A060951 REPORT DATE: 78 FINAL REPORT

Surface Polaritons in LO-Phonon-Plasmon Coupled Systems in Semiconductors,
AD-A078151 REPORT DATE: 28 JUL 76 FINAL REPORT

Theory of Bound States Associated with n-Type Inversion Layers on Silicon.
AD-A048216 REPORT DATE: NOV 77 FINAL REPORT

Theory of Damped Surface Magnetoplasmons in n-Type InSb.
AD-A060688 REPORT DATE: 76 FINAL REPORT

Theory of Impurity-Shifted Intersubband Transitions in n-Type Inversion Layers on (100) Silicon.
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Theory of Light Scattering from Soft Modes in IV-VI Compounds,
AD-A078446 REPORT DATE: 22 SEP 78 FINAL REPORT

Theory of Surface Polaritons in n-InSb in the Presence of a DC Current and an External DC Magnetic Field.
AD-A048217 REPORT DATE: NOV 77 FINAL REPORT

Theory of Surface Polaritons in n-Type Silicon in the Presence of a DC Current.
AD-A063097 REPORT DATE: DEC 78 FINAL REPORT

AD-A086 909 20/3

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Effect of Surface Roughness on the Image Potential, (U)

JUL 78 19P Rahman,Talat S. ;Maradudin, Alexei A. ;
CONTRACT: F49620-78-C-0019
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-80-0527

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review B, v21 n2 p504-521, 15 Jan 80.
DESCRIPTORS: *Potential theory, *Poisson equation, Dielectrics, Surface roughness, Electrostatic fields, Bessel functions, Reprints (U)
IDENTIFIERS: WUAFOSR2306C2, PE61102F (U)

Reprint: Effect of Surface Roughness on the Image Potential.

AD-A086 906 20/3

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Contribution of Electron-Electron Normal Scattering Processes to the Electrical Resistivity of Thin Wires, (U)

OCT 79 9P Black,J. E. ;
CONTRACT: F49620-78-C-0019
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-80-0529

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review B, v21 n8 p3279-3286, 15 Apr 80.
DESCRIPTORS: *Electrical resistance, *Electric wire, Electron scattering, Impurities, Reprints (U)
IDENTIFIERS: Knudsen minimum, Poiseuille flow, Phonon scattering, WUAFOSR2306C2, PE61102F (U)

Reprint: Contribution of Electron-Electron Normal Scattering Processes to the Electrical Resistivity of Thin Wires.

AD-A082 579 20/9 20/14

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Fundamental Radiative Instability of Accelerated Plasmas, (U)

AUG 78 11P Buschauer,Robert ;Benford, Gregory ;
REPT. NO. UCI-TR-78-6
CONTRACT: DAAG29-78-G-0020
MONITOR: ARO 15118.1-P

UNCLASSIFIED REPORT

Availability: Pub. in Physics of Fluids, v22 n7 p1297-1305 Jul 79 (No copies furnished by DTIC).
DESCRIPTORS: *Plasmas(Physics), *Microwave beams, Stability, Perturbations, High power, Cyclotron resonance, Reprints (U)
IDENTIFIERS: *Plasma instabilities, Counterstreaming plasmas (U)

Reprint: Fundamental Radiative Instability of Accelerated Plasmas.

AD-A082 578 20/14

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Coherent Curvature Radiation from an Electron Beam Rotating in a Plasma, (U)

SEP 78 7P Tzach,D. ;Benford,Gregory ; Roberson,C. W. ;Rostoker,N. ;
REPT. NO. UCI-TR-79-8
CONTRACT: DAAG29-78-G-0020
MONITOR: ARO 15118.4-P

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Applied Physics, v50 n10 p6241-6246 Oct 79 (No copies furnished by DTIC).
DESCRIPTORS: *Microwave beams, *Coherent electromagnetic radiation, Radiofrequency pulses, Plasmas(Physics), Interactions, Electron beams, Reprints (U)

Reprint: Coherent Curvature Radiation from an Electron Beam Rotating in a Plasma.

AD-A082 577 20/14

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Microsecond Microwave Radiation Bursts from a
Relativistic Electron Beam Rotating in a
Plasma, (U)

JAN 79 5P Tzach,D. ;Robertson,C. W.
;Benford,G. ;Rostoker,N. ;
REPT. NO. UCI-TR-78-42
CONTRACT: DAAG29-78-G-0020
MONITOR: ARO 15118.3-P

UNCLASSIFIED REPORT

Availability: Pub. in IEEE Transactions on Plasma Science, vPS-7 n2 p81-83 Jun 79 (No copies furnished by DTIC).
DESCRIPTORS: *Microwave beams, *Radiofrequency pulses, Plasmas(Physics), Interactions, Electron beams, Relativity theory, Microsecond time, Reprints (U)

Reprint: Microsecond Microwave Radiation Bursts from a Relativistic Electron Beam Rotating in a Plasma.

AD-A078 458 7/4

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Light Scattering Spectra of Guided Wave
Polaritons in Thin Crystals: Experiment, (U)

MAY 78 5P Valdez ,J. B. ;Mattei ,G.
;Ushioda,S. ;
REPT. NO. UCI-TR-77-74
CONTRACT: AFOSR-77-3222
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-1135

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Solid State Communications, v27 n11 p1089-1092 1978.
DESCRIPTORS: *Crystals, *Gallium phosphides, *Thinness, Light scattering, Phonons, Raman spectra, Thickness, Measurement, Reprints (U)
IDENTIFIERS: GWP (Guided Wave Polaritions), Surface polaritons, Coupled modes, Thin crystals, Guided Wave Polaritons, WUAFOSR2306C2, PE61102F (U)

Reprint: Light Scattering Spectra of Guided Wave Polaritons in Tin Crystals: Experiment.

AD-A078 448 20/12

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Influence of fd Mixing on Electronic Impurity Levels in Rare Earth Semiconducting Compounds, (U)

79 3P Camley ,R. ;Parlebas ,J. C. ;Subbaswamy ,K. R. ;Mills,D. L. ;
REPT. NO. 78-56
CONTRACT: F49620-78-C-0019
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-1104

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN Jnl. de Physique, supp15 v40 p372-373 May 79. Abstract in French.
DESCRIPTORS: *Semiconductors, *Chalcogens, *Solid state electronics, *Energy levels, Band theory of solids, Anions, Impurities, Samarium compounds, Sulfides, Valence, Transitions, Rare earth compounds, Reprints (U)
IDENTIFIERS: Samarium sulfide, WUAFOSR2306C2, PE61102F (U)

Reprint: Influence of fd Mixing on Electronic Impurity Levels in Rare Earth Semiconducting Compounds.

AD-A078 446 7/4

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Theory of Light Scattering from Soft Modes in IV-VI Compounds, (U)

SEP 78 19P Katayama ,S. ;Mills,D. L. ;
CONTRACT: F49620-78-C-0019
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-1106

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review B, v19 n12 p6372-6389, 15 Jun 79.
DESCRIPTORS: *Light scattering, *Theory, Reprints, Raman spectra, Interference, Phonons, Barium compounds, Titanium oxides, Potassium, Phosphoric acids, Strontium compounds (U)
IDENTIFIERS: Soft modes, Acoustical modes, Coupled modes, Raman brillouin Spectra, WUAFOSR2306C2, PE61102F (U)

Reprint: Theory of Light Scattering from Soft Modes in IV-VI Compounds.

AD-A078 445 20/12 20/3

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Influence of a Magnetic Field on High-Frequency Relaxation Time in N-type Polar Semiconductors, (U)

DEC 78 13P Katayama ,S. ;Mills,D. L. ;

CONTRACT: F49620-78-C-0019
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-1105

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review B, v19 n12 p6513-6524, 15 Jun 79.
DESCRIPTORS: *N type semiconductors, *Magnetic fields, Transport properties, Relaxation time, Electromagnetic scattering, Photons, Reprints (U)
IDENTIFIERS: Kubo conductivity, WUAFOSR2306C2, PE61102F (U)

Reprint: Influence of a Magnetic Field on High-Frequency Relaxation Time in N-type Polar Semiconductors.

AD-A078 180 20/3

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Spin-Wave Renormalization in Exchange- and Dipolar-Coupled Ferromagnets: Bulk Spin Waves and the Damon-Eshbach Surface Spin Wave, (U)

MAR 79 18P Rahman,Talat S. ;Mills, D. L. ;

CONTRACT: F49620-78-C-0019
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-1181

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review B, v20 n3 p1173-1188, 1 Aug 79.
DESCRIPTORS: *Ferromagnetic materials, *Spin states, Light scattering, Surface waves, Europium compounds, Thermal properties, Reprints (U)
IDENTIFIERS: *Spin waves, Europium oxides, PE61102F, WUAFOSR2306C2 (U)

Reprint: Spin-Wave Renormalization in Exchange- and Dipolar-Coupled Ferromagnets: Bulk Spin Waves and the Damon-Eshbach Surface Spin Wave.

AD-A078 151   9/3   20/8

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Surface Polaritons in LO-Phonon-Plasmon Coupled Systems in Semiconductors, (U)

JUL 76   7P   Tajima ,T. ;Ushioda,S. ;
CONTRACT: AFOSR-77-3222
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-1137

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review B, v18 n4 p1892-1897, 15 Aug 78.
DESCRIPTORS: *Charge coupled devices, Phonons, Plasmons, Electron density, Light scattering, Polarization (U)
IDENTIFIERS: Surface polaritons, PE61102F, WUAFOSR2306C2 (U)

Reprint: Surface Polaritons in LO-Phonon-Plasmon Coupled Systems in Semiconductors.

AD-A078 150   20/8

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Raman Scattering Selection Rules for Surface Polaritons, (U)

77   6P   Valdez ,J. B. ;Ushioda ,S. ;Mattei,G. ;
CONTRACT: AFOSR-77-3222
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-1136

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Surface and Interface Phonon Properties, p318-321 1977.
DESCRIPTORS: *Selection rules(Physics), Light scattering, Raman spectra, Phonons, Single crystals, Reprints (U)
IDENTIFIERS: Surface polaritons, PE61102F, WUAFOSR2306C2 (U)

Reprint: Raman Scattering Selection Rules for Surface Polaritons.

AD-A073 075 20/3

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Some Consequences of Surface Roughness for
the Dynamical Properties of Solid Surfaces, (U)

79 5P Castiel,D. ;Eguiluz,A. ;
Maradudin,A. A. ;Mills,D. L. ;Wallis,R.
F. ;
REPT. NO. TR-77-41
CONTRACT: N00014-76-C-0121, AFOSR-76-2887
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-0926

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Availability: Pub. in Surface and
Interface Phonon Properties, p330-333 1979.
DESCRIPTORS: *Rayleigh waves, *Surface roughness,
Phonons, Surface waves, Green's function, Tensor
analysis, Stress analysis, Reprints (U)
IDENTIFIERS: Polaritons, PE61102,
WUAFOSR2306C2 (U)

Reprint: Some Consequences of Surface Roughness
for the Dynamical Properties of Solid Surfaces.

AD-A070 425 20/12 12/1

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Complex Scalar Fields in One Dimension with
Fourfold Phase Anisotropy: Solitary-Wave
Solutions, (U)

MAR 78 11P Subbaswamy,K. R. ;
Trullinger,S. E. ;
CONTRACT: F49620-78-C-0019, NSF-DMR77-08445
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-0700

UNCLASSIFIED REPORT

Availability: Pub. in Physical Review A, v19 n3
p1340-1349 Mar 79.
SUPPLEMENTARY NOTE: Prepared in cooperation with the
University of Southern California, Los Angeles,
Dept. of Physics.
DESCRIPTORS: *Wave functions, *Scalar functions,
*Mathematical models, Nonlinear systems,
Anisotropy, Energy levels, Reprints (U)
IDENTIFIERS: WUAFOSR2306C2, PE61102F (U)

Reprint: Complex Scalar Fields in One Dimension
with Fourfold Phase Anisotropy: Solitary-Wave
Solutions.

AD-A070 396 7/4 11/6

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Simple Calculation of Optical Absorption of Ni in the Near Infrared, (U)

JUN 78 13P Parlebas,J. C. ;Mills,D. L. ;
REPT. NO. TR-78-19
CONTRACT: F49620-78-C-0019
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-0708

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Physics, F: Metal Physics, v9 n3 p591-602 1979.
DESCRIPTORS: *Absorption spectra, *Near infrared radiation, *Nickel alloys, Computations, Electronic states, Band spectra, Reprints (U)
IDENTIFIERS: PE61102F, WUAFOSR2306C2 (U)

Reprint: Simple Calculation of Optical Absorption of Ni in the Near Infrared.

AD-A069 334 20/3

CALIFORNIA UNIV IRVINE

Surface Acoustic Wave Propagation on Magnetic Substrates. (U)

DESCRIPTIVE NOTE: Final rept. 21 Feb 77-20 Feb 79,
MAY 79 11P Mills,D. L. ;
CONTRACT: DAAG29-77-G-0101
MONITOR: ARO 14769.4-P

UNCLASSIFIED REPORT

DESCRIPTORS: *Rayleigh waves, *Ferromagnetic materials, *Surface waves, *Acoustic waves, Substrates, Thin films, Magnetic resonance, Brillouin zones (U)
IDENTIFIERS: *Spin waves (U)

This report provides a summary of the results of a study which explored the interaction of (Rayleigh) surface acoustic waves with the magnetic excitations of a ferromagnetic material. (Author) (U)

AD-A068 133   20/2

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Photoelastic and Surface-Corrugation Contributions to Brillouin Scattering from an Opaque Crystal,   (U)

APR 78   20P   Subbaswamy,K. R. ;Maradudin, A. A. ;
REPT. NO. 78-13
CONTRACT: F49620-78-C-0019
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-0371

UNCLASSIFIED REPORT

Availability: Pub. in Physical Review B, v18 n8 p4181-4199, 15 Oct 78.
DESCRIPTORS: *Light scattering, *Brillouin zones, Phonons, Interactions, Scattering cross sections, Green's function, Reprints   (U)
IDENTIFIERS: WUAFOSR2306C2, PE61102F   (U)

Reprint: Photoelastic and Surface-Corrugation Contributions to Brillouin Scattering from an Opaque Crystal.

AD-A067 635   20/3

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Magnetic Scattering of Electrons from Ferromagnets in the Presence of Magnetic Surface Reconstruction,   (U)

JUL 78   4P   Demangeat,C. ;Mills,D. L. ;
CONTRACT: F49620-78-C-0019
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-0355

UNCLASSIFIED REPORT

Availability: Pub. in Solid State Communications, v27 n9 p839-841 1978.
DESCRIPTORS: *Electron scattering, *Ferromagnetism, Magnetic fields, Spin states, Mathematical models, Thermal properties, Reprints   (U)
IDENTIFIERS: PE61102F, WUAFOSR2306C2   (U)

Reprint: Magnetic Scattering of Electrons from Ferromagnets in the Presence of Magnetic Surface Reconstruction.

AD-A066 541   20/9

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Surface Plasma Waves in Silver and Gold.   (U)

DESCRIPTIVE NOTE: Interim rept.,
76   39P   Ferguson,P. ;Wallis,R. F. ;Belakhovsky,M. ;Jadot,J. P. ;Tomkinson,J. ;

CONTRACT: N00014-76-C-0121

UNCLASSIFIED REPORT

Availability: Document partially illegible.
DESCRIPTORS: *Plasma waves, *Surface waves, Dispersing, Attenuation, Silver, Gold, Electronic states, Damping, Maxwells equations, Reflectivity   (U)
IDENTIFIERS: *Polaritons, *Surface polaritons, WUNR392001   (U)

The dispersion curves for surface plasma waves (SPW) in Ag have been determined from calculated reflectivity minima as exhibited by attenuated total reflection (ATR spectra) for the prism-air-metal (PAM) configuration and from the direct calculation of the dispersion relation for the same configuration. The dispersion curves for Au have been determined by measuring the ATR spectra for the prism-dielectric-metal (PDM) configuration, by calculating the ATR spectra from published optical constants and from the direct calculation of the dispersion relation for the PDM configuration. We have found two general types of solutions from the direct calculation of the dispersion relation for both configurations. The two solutions are the surface or Brewster modes and the virtual modes. The characteristics of both modes are discussed. The effect of electronic damping upon the dispersion curves for Ag which exhibits low electronic damping and Au which exhibits moderate electronic damping is demonstrated. Finally the perturbing effect of the dielectric (referred herein as dielectric shift) upon the displacement of the dispersion curves to higher wave number for the PAM configuration for Ag and for the PDM configuration for Au is shown. (Author)   (U)

AD-A066 069   20/12

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Electromagnetic Modes of an Inversion Layer on a Semiconductor Surface,   (U)

JUN 77   52P   Eguiluz,A. ;Maradudin,A. A. ;
CONTRACT: N00014-76-C-0121, AFOSR-76-2887
PROJ: 2306
TASK: C2
MONITOR: AFOSR   TR-79-0131

UNCLASSIFIED REPORT

Availability: Pub. in Annals of Physics, v113 n1 p29-78 Jul 78.
DESCRIPTORS: *Band theory of solids, *Electrical conductivity, Fermi surfaces, Electric fields, Surface properties, Electron gas, Indium antimonides, Reprints   (U)
IDENTIFIERS: PE61102F, WUAFOSR2306C2   (U)

Reprint: Electromagnetic Modes of an Inversion Layer on a Semiconductor Surface.

AD-A065 708 20/2 20/12

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Effective-modulus Approximation for Surface-vibration Modes, (U)

AUG 77 9P Collett,J. T. ;Bishop,
Marilyn F. ;Trullinger,S. E. ;
CONTRACT: AFOSR-76-2887, AFOSR-71-2018
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-0136

UNCLASSIFIED REPORT

Availability: Pub. in Physical Review B, v18 n6 p2464-2471, 15 Sep 78.
SUPPLEMENTARY NOTE: Prepared in cooperation with Purdue Univ., Lafayette, IN. Dept. of Physics.
Sponsored in part by Grant NSF-DMR76-0889.
DESCRIPTORS: *Lattice dynamics, *Vibration, Crystal structure, Perturbation theory, Wave functions, Impurities, Rayleigh waves, Dispersion relations, Reprints (U)
IDENTIFIERS: PE61102F, WUAFOSR2306C2 (U)

Reprint: Effective-modulus Approximation for Surface-vibration Modes.

AD-A065 227 11/6 20/3

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

The g Tensor of d Holes in Palladium, (U)

MAY 78 15P Rahman,T. S. ;Parlebas,J.
C. ;Mills,D. L. ;
REPT. NO. TR-78-20
CONTRACT: F49620-78-C-0019
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-0133

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Physics, F: Metal Physics, v8 n12 p2511-2524 1978.
DESCRIPTORS: *Palladium, *Magnetic properties, Holes(Electron deficiencies), Tensor analysis, Ground state, Mathematical analysis, Reprints (U)
IDENTIFIERS: WUAFOSR2306C2, PE61102F (U)

Reprint: The g Tensor of d Holes in Palladium.

AD-A064 635 20/2

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Expansion Technique for Crystal Surface Problems, (U)

JAN 76 4P Trullinger,S. E. ;
CONTRACT: AFOSR-70-1936
PROJ: 9761
TASK: 02
MONITOR: AFOSR TR-77-0299

UNCLASSIFIED REPORT

Availability: Pub. in Jnl. of Mathematical Physics, v17 n10 p1884-1888 Oct 76.
DESCRIPTORS: *Crystal structure, *Surface properties, Spin states, Ferromagnetism, Dispersing, Eigenvalues, Reprints (U)
IDENTIFIERS: Spin waves, WUAFOSR976102, PE61102F (U)

Reprint: Expansion Technique for Crystal Surface Problems.

AD-A063 695 20/3

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Nonlocal Shift of Coupled Surface Plasmon-Surface Optical Phonon Modes in a Quantizing Magnetic Field, (U)

AUG 76 11P Brion,J. J. ;Wallis,R. F. ;Horing,Norman J. Morgenstern ;
CONTRACT: N00014-76-C-0121

UNCLASSIFIED REPORT

Availability: Pub. in Surface Science, v65 p379-388 1977.
SUPPLEMENTARY NOTE: Prepared in cooperation with Stevens Inst. of Tech., Hoboken, NJ.
DESCRIPTORS: *Plasmons, *Magnetooptics, Surface waves, Tensor analysis, Quantization, Spectrum analysis, Reprints (U)

Reprint: Nonlocal Shift of Coupled Surface Plasmon-Surface Optical Phonon Modes in a Quantizing Magnetic Field.

AD-A063 222 20/10 20/6

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Selection Rules in Raman Scattering from Surface Polaritons, (U)

FEB 77 6P Valdez,J. B. ;Ushioda,S. ;
CONTRACT: AFOSR-75-2760
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-77-0810

UNCLASSIFIED REPORT

Availability: Pub. in Physical Review Letters, v38 n19 p1098-1102, 9 May 77.
DESCRIPTORS: *Raman spectroscopy, *Selection rules(Physics), Light scattering, Surface waves, Gallium phosphides, Tensor analysis, Reprints (U)
IDENTIFIERS: *Polaritons, PE61102F, WUAFOSR2306C2 (U)

Reprint: Selection Rules in Raman Scattering from Surface Polaritons.

AD-A063 097 20/12 20/3 12/1

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Theory of Surface Polaritons in n-Type Silicon in the Presence of a DC Current. (U)

DESCRIPTIVE NOTE: Final rept.,
DEC 78 27P Martin,B. G. ;Maradudin,A. A. ;Wallis,R. F. ;
REPT. NO. TR-78-51
CONTRACT: N00014-76-C-0121

UNCLASSIFIED REPORT

DESCRIPTORS: *N type semiconductors, *Silicon, *Surface properties, *Direct current, *Mathematical analysis, Polarization, Drift, Carrier waves, Surface waves, Frequency, Electrons (U)
IDENTIFIERS: Polaritons, WUNR392000 (U)

A theoretical investigation has been carried out on the effect of a drift current on surface polaritons in n-type silicon. The current direction is taken to be parallel to the direction of propagation of the surface polaritons. From the dispersion curves, there is evidence that an interaction takes place between the current and the polaritons which gives rise to polariton instability or amplification for certain frequency ranges. These instabilities are believed to be due to the presence of the surface. (Author) (U)

AD-A062 421 20/2

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Dynamic Effective Charge and Surface Reconstruction on Si(111), (U)

MAY 76 19P Trullinger,S. E. ;
Cunningham,S. L. ;
CONTRACT: N00014-69-A-0200-9003, AFOSR-70-1936
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-79-0285

UNCLASSIFIED REPORT

Availability: Pub. in Physical Review B, v18 n4 p1898-1915, 15 Aug 78.
DESCRIPTORS: *Silicon, *Crystal structure, Surface properties, Electric charge, Dynamics, Stability, Reprints (U)
IDENTIFIERS: PE61102F, WUAFOSR2306C2 (U)

Reprint: Dynamic Effective Charge and Surface Reconstruction of Si(111).

AD-A062 250 20/10

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

A Surface Plasmon Dispersion Relation in the Presence of Spatial Dispersion. (U)

DESCRIPTIVE NOTE: Final rept.,
SEP 78 26P Maradudin,A. A. ;
REPT. NO. TR-78-16
CONTRACT: N00014-76-C-0121

UNCLASSIFIED REPORT

DESCRIPTORS: *Plasmons, *Quantum statistics, Dispersion relations, Spatial distribution, Surface waves, Dielectrics, Maxwells equations, Tensor analysis (U)
IDENTIFIERS: WUNR 392001 (U)

A dispersion relation for surface plasmons (retardation neglected) is obtained in the presence of spatial dispersion. The physical system considered is one of vacuum separated by a plane interface from a dielectric medium occupying the half-space x3 > 0, and characterized by a nonlocal dielectric function assumed to be symmetric in x3 and x3'. Here k-parallel is a two-dimensional wave vector whose components are parallel to the interface, and omega is the frequency of the electromagnetic field in the medium. The use of the dispersion relation is illustrated by applying it to two examples: a local dielectric constant; and the nonlocal dielectric function used previously by Maradudin and Mills. In both cases previously obtained results are recovered. (U)

AD-A062 164 20/12 20/2

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Surface Phonons and Polaritons. (U)

DESCRIPTIVE NOTE: Final rept.,
76 407P Maradudin,A. A. ;Wallis,R.
F. ;Dobrzynski,L. ;
REPT. NO. TR-74-47
CONTRACT: N00014-76-C-0121

UNCLASSIFIED REPORT

DESCRIPTORS: *Lattice dynamics, *Phonons, Crystal lattices, Surface properties, Vibration, Thermal expansion, Attenuation, Surface waves, Green's function, Specific heat, Rayleigh waves (U)
IDENTIFIERS: *Polaritons, Normal modes theory, WUNR392001 (U)

An extensive review is given of surface phenomena associated with phonons and polaritons. Among the topics discussed are surface modes of vibration, surface specific heat, interaction of defects with surfaces, surface atom mean square displacements, surface thermal expansion, and surface wave attenuation. Explicit examples of a number of these phenomena are worked out in detail. (Author) (U)

AD-A060 952 20/12

CALIFORNIA UNIV IRVINE

Theory of Impurity-Shifted Intersubband Transitions in n-Type Inversion Layers on (100) Silicon. (U)

DESCRIPTIVE NOTE: Final rept.,
78 5P Kramer,G. M. ;Wallis,R.
F. ;
REPT. NO. 78-51
CONTRACT: N00014-76-C-0121

UNCLASSIFIED REPORT

DESCRIPTORS: *Silicon, *N Type semiconductors, *Silicon dioxide, Inversion, Layers, Transitions, Impurities, Wave functions, Separation, Energy, Electric fields (U)
IDENTIFIERS: WUNR392001 (U)

Binding energies and variational wave functions are calculated as functions of electric field for electron impurity states split off from electric subbands of (100) silicon and silicon dioxide. The impurity-shifted intersubband transition energies are presented. (Author) (U)

AD-A060 951 20/12

CALIFORNIA UNIV IRVINE

Surface Polaritons in a Degenerate Semiconductor with a Surface Depletion Layer: Hydrodynamical Model. (U)

DESCRIPTIVE NOTE: Final rept.,
78 5P Wallis,R. F. ;Castiel,D. ;
Quinn,J. J. ;
REPT. NO. 78-50
CONTRACT: N00014-76-C-0121

UNCLASSIFIED REPORT

DESCRIPTORS: *Solid state electronics, *Semiconductors, *Surfaces, *Gallium arsenides, *Germanium, Depletion, Layers, Phonons, Charge carriers, Hydrodynamics, Mathematical models (U)
IDENTIFIERS: Polaritons, WUNR392001 (U)

Surface polariton modes are investigated theoretically for a slab of one semiconductor on a semi-infinite substrate of a second semiconductor. Specific calculations are carried out for a slab of intrinsic GaAs on degenerate n-Ge. The case of a slab of degenerate n-Ge on intrinsic GaAs is also investigated. (Author) (U)

AD-A060 950 20/14

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Attenuation of Rayleigh Waves by Point Defects. (U)

DESCRIPTIVE NOTE: Final rept.,
77 55P Wallis,R. F. ;Mills,D.
L. ;Maradudin,A. A. ;
REPT. NO. TR-77-46
CONTRACT: N00014-76-C-0121, AFOSR-76-2887

UNCLASSIFIED REPORT

DESCRIPTORS: *Rayleigh waves, *Surface waves, *Attenuation, Point defects, Green's function, Wave propagation, Anisotropy, Elastic waves (U)
IDENTIFIERS: Poynting vector, Mean free path, WUNR392001 (U)

A Green's function method has been used to obtain an expression for the mean free path of a Rayleigh wave propagating along a planar free surface of an isotropic elastic continuum and scattered by a mass defect. The change in density associated with the mass defect is assumed to be Delta m delta (x-x sub 0) where x sub 0 is the position vector of the defect and Delta m is the mass change. The Green's function is evaluated for an isotropic elastic continuum with a stress-free planar surface. Using this Green's function, the continuum equations of motion are formally solved for the particle displacement of the scattered wave in terms of the particle displacement of the incident wave. The Poynting vectors are then calculated for the incident wave and the scattered wave. Explicit results for the scattered wave Poynting vector are obtained in the asymptotic limit of large distance from the mass defect. The mean free path is then obtained from the ratio of the magnitudes of the incident Poynting vector and the asymptotic scattered Poynting vector. The results are compared with those of other workers. (Author) (U)

AD-A060 688 20/12

CALIFORNIA UNIV IRVINE

Theory of Damped Surface Magnetoplasmons in n-Type InSb. (U)

DESCRIPTIVE NOTE: Final rept.,
76 25P Martin,B. G. ;Maradudin,A. A. ;Wallis,R. F. ;
REPT. NO. TR-78-9
CONTRACT: N00014-76-C-0121

UNCLASSIFIED REPORT

DESCRIPTORS: *Indium antimonides, *Plasmons, *N type semiconductors, Surfaces, Damping, Magnetic fields, Interactions, Phonons, Mathematical models, Theory (U)
IDENTIFIERS: Surface polaritions, Magnetoplasma waves, WUNR392001 (U)

A theoretical investigation of surface magnetoplasmons in n-type InSb has been carried out with the effect of damping taken into account. Part of the investigation included surface magnetoplasmons interacting with surface optical phonons. The calculated dispersion curves show backbending, in contrast to the situation where damping is neglected. In addition, there are gaps in the dispersion curves for certain frequency ranges. (Author) (U)

AD-A057 732 20/12 20/3

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Electromagnetic Modes of an Inversion Layer. (U)

DESCRIPTIVE NOTE: Technical rept.,
78 10P Eguiluz,Adolfo ;Maradudin,A. A. ;
REPT. NO. TR-77-47
CONTRACT: N00014-76-C-0121, AFOSR-76-2887
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-78-1216

UNCLASSIFIED REPORT

Availability: Pub. in Surface Science v73 p437-445 1978.
DESCRIPTORS: *N type semiconductors, *Electromagnetic properties, Inversion, Layers, Dielectric properties, Surface properties, Approximation(Mathematics) (U)
IDENTIFIERS: WUAFOSR2306C2, PE61102F (U)

Reprint: Electromagnetic Modes of an Inversion Layer.

AD-A051 939 20/13

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Surface Contribution to the Low-Temperature Specific Heat of a Cubic Crystal, (U)

MAY 77 7P Portz,Kevin ;Maradudin, Alexei A. ;
REPT. NO. 77-20
CONTRACT: N00014-76-C-0121, AFOSR-76-2887
PROJ: 2306
TASK: C2
MONITOR: AFOSR TR-78-0447

UNCLASSIFIED REPORT

Availability: Pub. in Physical Review B, v16 n8 p3535-3540, 15 Oct 77.
DESCRIPTORS: *Specific heat, *Surface energy, *Crystals, Low temperature, Elastic properties, Fourier analysis, Reprints (U)
IDENTIFIERS: PE61102F, WUAFOSR2306C2 (U)

Elasticity theory is applied to determine the surface contribution to the low-temperature specific heat of a cubic crystal bounded by a (001) stress-free surface. The result has the form Delta C sub nu(T)=BST squared, where S is the area of the crystal surface and T is the absolute temperature. The coefficient B is expressed in terms of an integral over the trace of a reduced, dynamical Green's tensor for a semi-infinite cubic elastic medium bounded by a (001) stress-free surface. The reduced Green's tensor is effectively the leading term in the large k(parallel) expansion of the Fourier transform, in the coordinates parallel to the surface, of the full Green's tensor for this system, and its elements satisfy a set of nine coupled second-order ordinary differential equations in the coordinate normal to the surface together with appropriate boundary conditions. These equations have been solved analytically, and the necessary integrals evaluated numerically for a range of values of the elastic moduli c11, c12, c44 of the medium. (U)

AD-A048 513 20/9 20/3

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Surface Magnetoplasma Waves in Nickel, (U)

77 4P Ferguson ,P. E. ;Stafsudd, O. M. ;Wallis,R. F. ;
CONTRACT: N00014-76-C-0121, N00014-69-A-0200-9003

UNCLASSIFIED REPORT

Availability: Pub. in Physica, 86-88B p1403-1405 1977.
DESCRIPTORS: *Plasma waves, *Kerr magnetooptical effect, *Nickel, Thin films, Surface waves, Reflectivity, Dispersing, Reprints (U)
IDENTIFIERS: WUNR392001 (U)

Surface managetoplasma waves (SMPW) have been measured in a thin nickel film using the attenuated total reflection technique. Detection of the SMPW is manifested through the measurement of the normalized reflectivity difference for the transverse Kerr magneto-optic effect. The dispersion relation for SMPW for a thin magnetic film has been derived. Theoretical and experimental results are presented. (Author) (U)

AD-A048 217 20/12 20/6

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Theory of Surface Polaritons in n-InSb in the Presence of a DC Current and an External DC Magnetic Field. (U)

DESCRIPTIVE NOTE: Interim rept.,
NOV 77 5P Martin ,B. G. ;Maradudin, A. A. ;Wallis,R. F. ;
REPT. NO. 77-26
CONTRACT: N00014-76-C-0121

UNCLASSIFIED REPORT

DESCRIPTORS: *Semiconductors, *Indium antimonides, *Photons, *Phonons, Surfaces, Quantum theory, Theory, Direct current, Magnetic fields, Dispersions (U)
IDENTIFIERS: *Polaritons, WUNR392001 (U)

The dispersion relation for p-polarized surface polaritons has been obtained for n-InSb when a dc electric current is flowing parallel to the surface. An external, dc magnetic field, parallel to the surface, and perpendicular to the direction of propagation of the surface polariton, is assumed to be present. The solutions of the dispersion relation show that the presence of the magnetic field shifts the surface polariton dispersion curve with respect to the no-field curve. The inclusion of damping leads to backbending of the dispersion curves across the light line. Amplification of the surface polariton can occur for drift velocities greater than a certain critical value. (Author) (U)

AD-A048 216 20/12

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Theory of Bound States Associated with n-Type Inversion Layers on Silicon. (U)

DESCRIPTIVE NOTE: Interim rept.,
NOV 77 18P Kramer,G. M. ;Martin,B. G. ;Wallis,R. F. ;
REPT. NO. TR-77-9
CONTRACT: N00014-76-C-0121

UNCLASSIFIED REPORT

DESCRIPTORS: *Silicon, *N type semiconductors, *Impurities, *Electrons, Silicon dioxide, Interfaces, Inversion, Layers, Electric fields, Excitation, Ground state, Solid state physics (U)
IDENTIFIERS: Inversion layers, Bound states, WUNR392001 (U)

The ground state and two excited states of an electron bound to a charged impurity located at the interface between silicon and silicon dioxide have been investigated. The interface was taken to be parallel to a (001) plane and a static electric field p perpendicular to the surface was assumed. Calculations of the electron binding energies as functions of electric field were made for a bare charged impurity with screening by free carriers neglected. It was found that the binding energy increases with electric field and approaches that of the corresponding state of a two-dimensional hydrogen-like atom in the limit of infinite electric field. The case where the impurity is located within the oxide has also been investigated. (Author) (U)

AD-A045 736 20/11 20/2

CALIFORNIA UNIV IRVINE

Elastic Continuum Theory of Interface-Atom Mean-Square Displacements, (U)

SEP 76 10P Djafari-Rouhani,B. ;
Dobrzynski,L. ;Wallis,R. F. ;
CONTRACT: N00014-76-C-0121

UNCLASSIFIED REPORT

Availability: Pub. in Physical Review B, v16 n2 p741-749, 15 Jul 77.
DESCRIPTORS: *Continuum mechanics, *Surface properties, *Crystallography, Displacement, Elastic properties, Interfaces, Phonons, Green's function, Reprints (U)
IDENTIFIERS: WUNR392001 (U)

The mean-square displacements of particles near an interface between two different isotropic elastic continua are calculated for the first time. A Green's function method was used in the high-temperature limit. The dependence of the mean-square displacements on distance from the interface is exhibited explicitly. (Author) (U)

AD-A045 502 20/11

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Elastic Continuum Theory of Surface-Atom Mean-Square Displacements, (U)

JUL 76 6P Wallis,R. F. ;Maradudin,A.
A. ;Dobrzynski,L. ;
REPT. NO. 76-14
CONTRACT: N00014-76-C-0121, N00014-69-A-0200-9003

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Availability: Pub. in Physical Review B, v15 n12 p5681-5685, 15 Jun 77.
DESCRIPTORS: *Solid state physics, *Surface properties, *Vibration, Displacement, Isotropism, Elastic properties, Electron diffraction, Reprints (U)
IDENTIFIERS: WUNR392001 (U)

The mean-square displacements of particles in a semi-infinite isotropic elastic continuum with a free surface are calculated in the high-temperature limit using a Green's function method. The dependence of the mean-square displacements on distance from the surface is exhibited explicitly. The results are discussed and compared with previous work. (Author) (U)

AD-A043 314   20/12

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

The Dielectric Constant Associated with
Direct Interband Transitions in Germanium,
(U)

NOV 76   4P   Martin,B. G. ;Wallis,R.
F. ;
REPT. NO. 76-22
CONTRACT: N00014-76-C-0121

UNCLASSIFIED REPORT

Availability: Pub. in Solid State
Communications, v21 p385-387 1977.
DESCRIPTORS: *Germanium, *Dielectric properties,
Optical properties, Semiconductors, Band theory of
solids, Electron transitions, Reprints   (U)
IDENTIFIERS: WUNR392001   (U)

An expression for the complex dielectric constant associated with direct interband transitions in germanium has been obtained using a simple model. The model consists of four damped oscillators, and a fit to experimental results for the complex dielectric constant is made to obtain the model parameters, i.e., the oscillator frequencies and damping constants. The results show good agreement with experimental data over a broad range of frequencies. (Author)   (U)

AD-A043 313   20/10   20/3

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Magnon Edge Modes,   (U)

AUG 76   8P   Maradudin,A. A. ;Moss,S.
L. ;Cunningham,S. L. ;
CONTRACT: N00014-76-C-0121, N00014-69-A-0200-9003

UNCLASSIFIED REPORT

Availability: Pub. in Physical Review B, v15 n9
p4490-4496, 1 May 77.
DESCRIPTORS: *Magnons, *Ferromagnetic materials,
Exchange reactions, Wedges, Edges, Modes,
Decay schemes, Reprints   (U)
IDENTIFIERS: *Heisenberg ferromagnets,
WUNR392001   (U)

An exact result is obtained for the dispersion relation for magnons localized at the apex of a semi-infinite, right-angle wedge of a simple-cubic, Heisenberg ferromagnet, with nearest- and next-nearest-neighbor exchange interactions, formed by the intersection of two (100) surfaces. The modes studied are wavelike in the direction parallel to the edge of the wedge, and they are characterized by a one-dimensional wave vector q. Their amplitudes decay exponentially with increasing distance into the wedge from its apex. The finite difference equation of motion for the magnon creation operators is solved by expanding the latter in a double series of Gottlieb functions. The dispersion relation for these edge localized modes is obtained for all values of q in the one-dimensional first Brillouin zone of the wedge.   (U)

AD-A037 884 20/3

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Electrostatic Edge Modes Along a Parabolic Wedge. (U)

DESCRIPTIVE NOTE: Interim rept.,
JUL 76 4P Eguiluz,A. ;Maradudin,A. A. ;
REPT. NO. 76-26
CONTRACT: N00014-76-C-0121, AF-AFOSR-2887-76
PROJ: 9763
TASK: 03

UNCLASSIFIED REPORT

Availability: Pub. in Physical Review B, v14 n12 p5526-5528, 15 Dec 76.
DESCRIPTORS: *Dielectrics, *Boundary value problems, Electrostatic fields, Wedges, Edges, Electromagnetic wave propagation, Modes, Reprints (U)
IDENTIFIERS: Laplace equation, PE61102F, WUAFOSR976303, WUNR392001 (U)

The electrostatic edge modes of a dielectric wedge whose boundary is a parabolic cylinder are calculated. The spectrum of edge modes is found to be discrete, and to depend on the one-dimensional wave vector q which characterizes the propagation of these modes along the wedge. The dispersion curves for the first four modes are plotted for the case of a parabolic wedge characterized by a free-electron metal dielectric constant. (U)

AD- 765 440 7/4 20/12

CALIFORNIA UNIV IRVINE DEPT OF PHYSICS

Phonon Contribution to the Free Energy of Interacting Adatom Pairs. (U)

DESCRIPTIVE NOTE: Interim rept.,
OCT 72 10P Cunningham,S. L. ; Dobrzynski,L. ;Maradudin,A. A. ;
REPT. NO. TR-72-53-Rev
CONTRACT: AF-AFOSR-71-2018
PROJ: AF-9763
TASK: 976303
MONITOR: AFOSR TR-73-1342

UNCLASSIFIED REPORT

Availability: Pub. in Physical Review B, v7 n10 p4643-4651, 15 May 73.
SUPPLEMENTARY NOTE: Supersedes report dated Apr 73, AD-759 035.
DESCRIPTORS: (*ADSORPTION, *FREE ENERGY), (*PHONONS, *SURFACES), ATOMS, CRYSTAL LATTICES, NUMERICAL ANALYSIS, THERMODYNAMICS (U)

The free energy due to the interaction through the crystal phonon field of two identical atoms adsorbed on a (100) surface of a simple cubic monatomic lattice is studied within the framework of the Montroll-Potts model. The zero-point energy of interaction was found analytically in the limit of large separation distances, and numerical results are presented for small separation distances. The leading temperature-dependent terms in the expansion of the free energy are given in closed form in both the low- and high-temperature limits. The results are given as a function of the mass and separation distance of the adsorbed atoms and as a function of the force constant binding the adsorbed atoms to the surface. Two adatoms on a surface were found to be attracted toward each other. (Modified author abstract) (U)

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